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Massachusetts. General Court. Joint Commit-
tee on Troy and Greenfield Railroad Company
Report.

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Mass. General Court .. Joint Special Com. on the Troy and Greenfield Railroad Company 3

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HOUSE....No. 125.

Commonwealth of Massachusetts.

HOUSE OF REPRESENTATIVES, April 13, 1853.

The Joint Special Committee, to whom was referred the petition of the Troy and Greenfield Railroad Company, for a Loan of the State Credit, to aid in constructing the Hoosac Tunnel, respectfully

REPORT:

That they have given to the subject, the time and attention which its importance demands. After hearing the opening for the petitioners they visited the mountain, saw the steam excavator in operation upon the rock, examined the rich valleys of the Hoosac and Deerfield, and descending the Hudson River Railroad, inspected, of the stone yards in New York, numerous machines constructed upon the same principle with that at the mountain, successfully engaged in dressing stone for the elegant structures of New York. Since their return to this city they have heard the petitioners at several sessions, and afforded the Western Railroad Company, who appeared as remonstrants, ample time to cross-examine the witnesses, and present their objections; and, after a careful consideration of the whole subject, your committee decide, with great unanimity, to report in favor of the petitioners.

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The subject referred to them presents many important inquiries, among the more prominent of which are the following:

1st.—Is it a feasible measure to tunnel the Hoosac? Can the tunnel, while in progress, and when finished, be properly ventilated, and traversed with reasonable speed and security?

2d.—Can the tunnel be constructed within a reasonable time?

3d.—Is there any assurance it can be made at a reasonable cost?

4th.—Will its completion insure an improved route from the metropolis and northern half of Massachusetts, to the great west, by a reduction of curves, grades, summit, and distance?

5th.—Will such improved route add to the travelling facilities of the State, by increasing speed and diminishing danger?

6th.—Will it diminish materially the cost of transit between the seaboard and eastern section of Massachusetts and the great West, and enable Massachusetts to participate more largely in that commerce which finds its outlet upon the Hudson?

7th.—What is the present extent of that commerce, and the ratio of its growth?

8th.—How far does the Western Railroad now facilitate that commerce, and participate therein, and how far is it important to give it proper facilities?

9th.—Will the construction of the tunnel and Troy, and Greenfield line injure the Western Railroad, endanger the State loan to that line, or seriously diminish the income upon the stock held in that enterprise?

10th.—Will the route in question develop, to any extent, the local resources of Massachusetts?

11th.—Is the proposed loan essential to the success of the enterprise, and will it be properly secured?

12th.—In view of the whole subject, is the State under any obligations of duty to lend its aid to this enterprise, and will the benefits it may reasonably anticipate exceed the risk it will assume?

Your committee respectfully present the conclusions at which they have arrived upon each of the points in question.

And, first is the tunnel feasible. Can it be properly ventilated, and be made safe for the traveller?

It is proposed by the petitioners to construct a tunnel twenty-four thousand one hundred feet in length, and of sufficient width for two tracks, and twenty feet in height.

It passes under the Hoosac, between a bend of the Deerfield and the Hoosac Rivers, in the towns of Florida and Adams, at a point where the mountain presents for four miles an undulating surface, varying in height from three hundred to seventeen hundred feet above the track—the average height being not far from one thousand feet. The surface is principally covered by farms in good cultivation, and shafts may be sunk in at least three several points, varying in depth from three hundred to eight hundred feet, and within a reasonable period. Three shafts will open eight faces for mining, and divide the original work into four tunnels of moderate length.

The number of cubic yards of rock to be removed from the entire tunnel is but three hundred and sixty-one thousand five hundred, according to the computation of the engineer, and in an open cut this rock could be removed for less than one dollar per yard, or in the aggregate, $361,500.

Several of the ablest geologists of the country, including the State Geologists of Massachusetts, New York, and Virginia, have examined the rock, and pronounced it mica slate, standing in almost vertical strata, showing themselves with great regularity on the sides of the acclivity, and upon the plain, and none of the geologists express a doubt that the same material will be met by the tunnel through its whole extent.

This mica slate is easily drilled and may be quarried in tunnels for three dollars per yard, and it is in proof that, if the hardest rock should be met at any point by the tunnel it would not add more than one dollar per yard to the cost of mining.

It was also in proof that no less than three railroad tunnels have lately been made in Europe, of less length, but through a more difficult material, with much water to encounter, and containing more cubic yards of rock than there are in the Hoosac tunnel, and some of them requiring a brick lining from end to end.

It was proved also that these were finished at a moderate cost, and in a brief period; and your committee, therefore, concur with the gentlemen who reported the charter of the Troy and Greenfield Railroad Company, and the joint committee that recommended the State to loan them their credit for two millions in 1851, that the enterprise is perfectly feasible.

As respects ventilation, it was proved that mines and tunnels were easily ventilated by air pipes, and artificial draft while in progress. It was also shown that coal mines, extending under miles of the earth's surface were easily ventilated by a shaft, with a furnace beneath, from which a strong draft was created up the aperture as a chimney, and it was distinctly proved by various witnesses that, in the long tunnels of Europe and the Middle States, no inconvenience whatever was experienced from smoke or steam, as they ventilated themselves, the vapor rising in a light wreath to the top of the arch, and there condensing against the rock or masonry. In one tunnel in England, General Pasley, an inspecting officer, passed a day, and made his inspection without inconvenience, while trains passed half hourly in each direction.

It is customary also to fill up the shafts when tunnels are completed. A reflecting lamp, in front of the engine illumines the tunnel for a long distance in advance, and the cars may be lighted by lamps, as is customary in the evening. With respect to the extent of tunnelling, evidence was laid before the committee of not less than one hundred miles of tunnels for canals and railways finished in Europe and America, two of which exceeded fifteen thousand feet each in length, and of one in Mexico twenty-one thousand six hundred and fifty-three feet long, finished two centuries since, in a single year. In this case it was also well established, that the mica slate would form a strong roof, and little inconvenience from water need be expected.

The second inquiry is, can the tunnel be made within a reasonable time?

2d.—According to the computations of the engineer of the Troy and Greenfield Railroad Company, who has carefully examined the line, and tested it by repeated surveys, which did not vary an inch in the level, the tunnel may be constructed in three to five years.

It was proved by several witnesses, that in the Blechingly tunnel, in England, shafts were sunk three and a half feet, daily, and in a shaft now in progress at Pottsville, relays of men, working eight hours, with steam pump and hoisting apparatus, sunk the entire shaft at the rate of at least three feet in twenty-four hours, and that the rate varied from one to three and one-half feet per day on shafts in the public works of England.

It was also proved that the mica slate was easily mined, that there was little grit to dull the mining tools, and a drilling machine was exhibited, now in general use for such purposes, which, it was testified, would regularly sink shafts at least six feet per day. This machine is owned by a company of gentlemen in Boston, and their agent, Mr. Whiting, is now an alderman of that city. A horizontal drilling machine for advancing the faces was also exhibited. It was further proved, that in mining tunnels, the work can be carried forward from fifteen to twenty-five feet per week, on each face. Your committee are well satisfied the work may be commenced at each end of the Hoosac Tunnel, that three shafts can be sunk, and the work driven from eight faces. By this course, the tunnel may be accomplished in four to five years.

But, in addition to this, your committee were very generally satisfied that the boring machine is correct in principle, requires but few alterations, that it will advance at least six feet daily, from each face, that it will cut a very smooth and perfect tunnel, with a considerable saving of time and expense, and they place great reliance upon it to expedite and cheapen the construction of the tunnel. The exhibition of the revolving cutters in New York, in their operation upon the hardest specimens of rock, and their movements on the largest scale in yards giving employment to hundreds of operatives, and paying great returns on capital, seemed to your committee perfectly conclusive.

3d.—We come, then, to the third point: Can any assurance be given that this tunnel can be made at a reasonable cost?

The tunnel proposed at the Hoosac, contains, as we have stated, three hundred and sixty-one thousand five hundred cubic yards, and the estimate of A. F. Edwards, the engineer of the Troy and Greenfield Company, is as follows:

146
8

32
16½
1920
320
160
5280

A brief statement of the highest estimate and longest time for the construction of the Tunnel Section of the Troy and Greenfield Railroad.

The length of tunnel, from heading to heading, is 24,100 lineal feet.
In volume, equal to 15 cubic yards per lineal foot.
Total amount of excavation, 361,500 cubic yards.
Cost of tunnel, per lineal foot, $69 52, viz.:

A,	36 feet, at 50 cents per foot, $13 50 a yard,	$18 00
B B,	100 " " 30 " " " 8 10 "	30 00
C,	269 " " 8 " " " 2 16 "	21 52
	405 cubic feet, equal to 15 cubic yards,	$69 52
	Cost, per cubic yard,	4 63½
	The whole amount for excavating tunnel,	$1,675,432 00
	Masonry, 6,025 perch, at $5,	30,125 00
	Air pipes, 1,085 tons, at $50,	54,000 00
	Superstructure, including iron, etc.,	64,000 00
	Engineering and contingencies,	125,000 00
		$1,949,557 00

It is proposed to construct the tunnel with grades, descending on either side from the centre, at the rate of twenty-six feet per mile, which will facilitate drainage and the removal of the rock from the outer faces, as the cars laden with stone will run out by the power of gravity. It is also intended to use the stone at the western end, to create a dam and water power upon the Deerfield, and at each extremity to make embankments with the stone down the valleys of the Deerfield and Hoosac.

It will be perceived, that the engineer's estimate allows $69 52 per lineal foot of tunnel, and $4 62 per cubic yard in the interior of the tunnel, to cover all contingencies. When a tunnel at the Hoosac was first recommended for a canal, twenty-six years since, by Loammi Baldwin, one of the first engineers this country has produced, he consulted general Bernard, then the distinguished head of our ordnance department, and he rated the cost at only $3 per cubic yard. Mr. Baldwin's, estimate for a canal tunnel was but $920,830 20. These sums are much below the estimate of Mr. Edwards.

At a subsequent period, it appears by the printed report of

Messrs. Swift, McNeill, Whistler and Childe, engineers of the Western Railroad Corporation, that in 1836, while making the surveys and location of the Western Railroad across the Berkshire Mountains, they made an elaborate comparison of the cost of tunnelling through gneiss and mica slate, compared with open cuts, and rated the cost of tunnelling as low as $65 per lineal foot. Indeed, captain Childe rated it as low as $60 per lineal foot, and by the report of the Western Railroad Company for 1842, signed by the directors and president, the honorable George Bliss, now speaker of the house, it appears these computations were verified, for the Canaan tunnel on the Western Railroad, made for a double track, by captain Childe, under the advice of Messrs. Swift, Whistler and McNeill, actually cost less than $63 per lineal foot, completed. This is the evidence of the Western Railroad itself, verified by its results; and its computation in tunnelling proves to have been more accurate than in open cuts and embankments. The Pulpit Rock tunnel, on the Reading Railroad, though very hard rock, cost $66 20 per lineal foot.

The Western Railroad Corporation proved the existence of several tunnels which had cost more per lineal foot, viz.: the Box Kilsby, the Rochdale Blechingly, and Blasé tunnels; but it was shown, by cross examination and rebutting evidence, that most of these tunnels were made many years since; that there has since been a decline in the cost of tunnelling of at least fifty per cent.; that most of them were carried through clay or quicksand, which, in a moist climate, are more expensive than rock, and require lining and arching. It also appeared that the area of these tunnels was more than double the size the area of the Hoosac. They are, therefore, by no means safe standards for comparison. Two other tunnels, on the line of the Ohio and Chesapeake Canal, were also cited by the remonstrants, more costly in the estimate of general Bernard, or in construction, than those relied on by your committee. But one required expensive masonry, and the other was paid for in depreciated paper.

As respects the cost of tunnelling, estimated by the cubic yard, it was shown that two small tunnels on the Troy and Greenfield line were actually let at $3 per yard, payable partly in stock and bonds; that in sixteen tunnels on the Baltimore and Ohio Railroad, the average cost was but $2 60 per cubic yard, and that a tunnel of eight thousand feet in length, under the hill in the rear of Cincinnati, is under contract to be finished in twenty-two months, at the rate of $2 25 per cubic yard.

Mr. Marchant, an eminent engineer and contractor, of England, who built the Box Tunnel, cited by remonstrants, upon a description of the rock and position of the Hoosac, estimated the cost as low as $1 75 to $2 per cubic yard. And the cost of the Canaan Tunnel on the Western Railroad, was but $3 52 per cubic yard. In comparison with these, the estimate for the Hoosac, of $4 62 per cubic yard, appears ample to cover all contingencies. The estimate of Mr. Edwards was confirmed by the testimony of James Hayward, Esq., one of the oldest, most cautious and experienced engineers of this State. Mr. Hayward had recently visited Europe, and devoted much time to the subject of tunnelling, and gave your committee much valuable information respecting the Woodhead Tunnel, which closely resembles the Hoosac. He also described the Box Tunnel on the Great Western, the Thames and Medway Tunnel, and the Nerthe or Marseilles Tunnel, works, varying from two to three miles in length, through bad material, and each containing more cubic yards than the proposed work at the Hoosac.

These works were accomplished in two to five years, at reasonable expense, in countries where ordinary labor is cheap, but the cost of work quite as high as in Massachusetts, officers and skilful men being paid more liberally. In the Woodhead Tunnel the work was carried through granite rock, and the shafts were from four hundred to six hundred feet in depth. On the Nerthe Tunnel there were seven thousand five hundred feet perpendicular of shafting, costing $150,000, and the deepest shaft exceeded six hundred feet in depth, being about the depth of the average of the three required at the Hoosac. Allowing for difference of area, and the absence of a brick lining, the Hoosac would cost, at the rate of the cost of the Woodhead Tunnel, $1,026,725; at the rate of the Nerthe or Marseilles, $1,329,726 33.

It was also shown to your committee, that the average cost of tunnels in England, was not far from £35 per lineal yard, or $58 32 per lineal foot; and your committee, in view of all these facts, feel assured the estimate of two millions offers a liberal margin to cover all contingencies.

4th.—The fourth inquiry is—Will the completion of this tunnel insure an improved route from Boston and the northern half of Massachusetts to the great West, by a reduction of distance, curves, grades and summit.

The route, via Rutland from Boston to the Hudson is very circuitous, being two hundred and fifty miles over grades of fifty-eight to sixty feet, on the Cheshire and Rutland, and Burlington Railroads. The route by the Western Railroad is two hundred and one miles from Boston to Albany, and two hundred and eight miles to the bridge over the Hudson, at Troy, New York.

The length of the entire line from Boston to Troy, via the Hoosac Tunnel, is but one hundred and eighty-six miles, and may be reduced to one hundred and eighty-three. It will effect a saving in distance, in the journey to Troy, from the great towns on the northern half of Massachusetts, varying with the position of the town from twenty-two to seventy miles, as will appear from the following table of distances to Troy.

TOWNS.	Via Western R. R.	Via Troy & Greenfield.	Via Rutland	Distance saved independent of grade in favor of Tunnel Route.	
	Miles.	*Miles.*	*Miles.*	*Miles.*	*Miles.*
From Boston,	208	186	249	22	63
“ Groton Junction,	192	151	214	41	63
“ Lowell,	209	168	231	41	63
“ From Nashua,	209	168	231	41	63
“ Manchester, N. H.,	226	185	248	41	63
“ Lawrence,	222	181	244	41	63
“ Salem, via Boston,	224	192	255	32	63
“ Newburyport,	242	201	264	41	63
“ Portsmouth,	259	218	281	41	63
“ Haverhill,	229	188	251	41	63
“ Dover,	264	223	286	41	63
“ Portland,	307	266	329	41	63
“ Fitchburg,	190	136	199	54	63
“ Ashburnham,	191	126	189	65	63
“ Greenfield,	146	81	–	65	
“ Brattleboro',	170	105	159	65	63
“ Myrick's Crossing,	250	228	291	22	63
“ Middleboro',	244	220	283	22	63
“ N. Adams,	78	48	–	30	63
“ N. Braintree,	218	196	259	22	63

It was also shown to your committee, that a line from Saratoga to Sacket's Harbor, on Lake Ontario, with easy grades, was about to be put under contract, which would connect with the Troy and Boston Line, at Eagle Bridge, on the completion of which, Boston would be placed within three hundred and thirty-six miles of Lake Ontario—actually nearer than the city of New York, within the compass of a ten hours' journey, and a similar advantage would accrue to all the northern towns of Massachusetts.

By a comparison of grades it was shown that going east, in which direction the freight greatly preponderates, there was no grade on the Troy and Boston Line, between the Hudson and Connecticut, exceeding thirty-nine six-tenths feet per mile, and none between the Connecticut and Boston exceeding forty-five feet per mile. On the Western, the grade from Albany to Pittsfield rises above forty-five feet to the mile, and between Pittsfield and Washington above seventy-six feet; between the Connecticut and Palmer it exceds sixty-five feet, and from Brookfield to Clappville it exceeds forty-nine feet. As respects curvature, the excess of curvature on the Western, compared with the Tunnel route between the Hudson and Connecticut, was shown to be more than seven entire circles of 360 degrees each. Two of the curves are of less than nine hundred feet radius, and some sharp curves occur on the steepest grades. Such curves greatly increase the risk of breakage to wheels and axles, the danger to life and limb, and the expense of repairs. When considered with the grades, they make the equated length of the two lines compare as follows:—

Equated length of Western Railroad from Hudson to Connecticut River, ...	188.6 miles,
Tunnel Route, ...	126.9 "

The importance of avoiding curves and grades if possible, is forcibly illustrated by Messrs. Swift, Whistler and McNeill in their printed official report to the Western Railroad Co., 1837, page 56: "The equated distance is the measure of the cost of transportation, and is perpetual." And again in their printed official report to the Western Railroad Company, Sept. 29, 1840, in a reference to an improved line they are adopting on the Albany and West Stockbridge: "The length of half a mile of reversing curves, radii seven hundred and sixty, eight hundred, and nine hundred and thirty feet, total curvature one hundred and eighty-eight; the resistance of these curves from increased friction, will be approximately equal to the additional ascent of twelve to forty-eight feet per mile, for velocities from ten to twenty miles per hour. We regard it, therefore, of great importance to avoid these curves." It is needless to enlarge on the value of such testimony.

As respects the height of summit, the Tunnel route has a most decided advantage, it being but eight hundred and twenty feet above the level of tide water, while the summit of the Western is six hundred and twenty feet higher, and the Tunnel route has the further advantage of preserving its elevation by crossing the Connecticut above several falls, at a height of one hundred and thirty-five feet above the bridge at Springfield, and thus saves grade and ascent on the route eastward.

5th.—The fifth inquiry is, will the improved, or Tunnel route, add to travelling facilities; will it increase speed and diminish danger?

The answer to this is easy, both from the facts already presented, and the further proof elicited by the committee. The saving of distances, curves and grades, and summit, must each effectually reduce the time of transit, and it was in evidence from a competent engineer, that the line was superior in its curvature to the Hudson River line, which partly compensated for its still more favorable grades, and he estimated it could be run as quickly with trains of ordinary size. There is, therefore, reason to presume express trains may be run by the Tunnel route in five hours between Troy and Boston.

6th.—The next inquiry which presents itself is the extent of the commerce now existing between the Great West and Tide Water on the Hudson, and what is the ratio of its growth.

When the Western Railroad was chartered, that commerce did not exceed 800,000 tons. The Western roads had made little progress, and the amount of intercourse with the lakes was comparatively small. It has since rapidly increased. In the last two years the number of tons passing between the Hudson River and the West and North-west by canals and railroads, was as follows:

In 1851,	2,832,358 tons.
In 1852,	3,457,282 "
Increase in 1852,	624,924 "

The number of passengers on four railroads leading from the north and west to the Hudson, viz.: the Albany and Schenectady, Rensselaer and Saratoga, Schenectady and Troy, and New York and Erie Railroads, was:

In 1851,	1,241,047 passengers.
In 1852,	1,555,133 "
Increase in 1852,	314,086 "

In 1852, the whole number of through tons transported by the Western Railroad, was but 59,375; and the through passengers by the same route were but 35,433, and for seven years past the passengers have remained nearly stationary in numbers, while the freight has been gradually diminishing.

It thus appears the Western Railroad transports through less than one-fiftieth part of the freight, and less than one-fortieth part of the passengers that reach the Hudson, in fact, less than one-ninth of the annual increase of this traffic.

This is humiliating to Massachusetts.

7th.—And the seventh inquiry naturally arises, Will the Tunnel route, with reduced distance, curves, grades and summit, enable it to participate more largely in this vast and rapidly increasing commerce which finds its outlet at the Hudson.

The State engineer and surveyor of the canals of New York, in his report to the assembly, January 1853, Assembly Document, No. 28, pages 53 to 58, states the following facts, which have a bearing on this question.

"The dividing of trade between New Orleans and the New York canals is now above the mouth of the Illinois River, but when the Erie Canal is enlarged, it will be extended to the Mississippi, at least as far down as St. Louis. The completion of the enlargement of the Erie Canal will reduce the expense of transportation about 75 *cents. per ton*, which is equivalent to extending the area of its drainage of trade 250 miles, on a river similar to the Ohio; 150 miles on an ordinary canal; 50

miles on a railroad, and 5 to 7 miles on common roads, where these distances are not met by competing lines and one-half of those distances where they are so met.

"The southern line of the trade drainage of the New York canals is about 1,000 miles long; the increased area of this drainage, which would be caused by the enlargement, would be equal to one-half of either of the North-western States, and embrace a belt of the most productive lands in four of those States.

"A reduction in the cost of transport through the Erie Canal such as that which will be produced by its enlargement, will also increase the amount of trade within the present drainage, by permitting the exportation of many articles of large bulk and small value, which are restrained at the present time by the cost of transportation.

"The whole area of the district, the trade of which concentrates at the eastern end of Lake Erie, is equal to 330,000 square miles. This table shows that seven North-western States and Canada, are an area of over 400,000 square miles, and that their annual agricultural and animal products exceeds 15,000,000 of tons.

"The commerce of the Western Lakes alone is now valued at over $300,000,000, and annually employs eighty thousand tons of steam and one hundred and forty thousand tons of sail vessels. The amount of flour and grain transported on the lakes in 1851 was, of flour, two millions of barrels; of wheat, eight millions; of corn, seven millions; and of oats and barley, two millions, making an aggregate of over twenty-seven millions of bushels of cereal produce.

"The whole exports of the same articles from the United States in 1851, were but little more than half of the above amount."

What can more clearly illustrate the value of this trade, and the effect of increased facilities?

New York is taxing her citizens, to expend twelve millions from the public purse, to enlarge the Erie Canal, to save *seventy-five cents* per ton, only, in the cost of transportation, and by such reduction, drains the commerce of an additional territory of fertile land, covering at least thirty thousand square miles, or four times the size of Massachusetts, and extends her drainage down the Ohio to St. Louis. If, then, it shall appear that the construction of this tunnel shall effect a much larger reduction without any expenditure or tax on the part of Massachusetts, its importance may be somewhat appreciated.

The capacity of a railroad with easy grades and curves, like those of the Tunnel route, is well illustrated by a railroad with similar curves and grades, the Rochester and Syracuse Railroad, New York. By extracts from the condensed tables published in the State Report on railroads for the past year, it appears the average cost of transporting each passenger and ton of freight on this line was between one-half cent and one cent per passenger and per ton a mile.

This cost is not so low as on the Utica and Schenectady Railroad, a still more level line, but it forcibly illustrates what a railroad with good curves, grades and terminal points, can accomplish, and this committee can see no reason why an immense traffic may not be, with a good and direct line, created between the metropolis of the East and the Great West. The Rochester and Syracuse competes with the canal, and indirectly with the Erie. The Tunnel route can have little or no competition. If it can command a similar business, the Tunnel route can transport passengers and freight at little more than half a cent per passenger, and the same price per ton a mile, for its fuel must be as cheap, or cheaper, and the foundation better than the clay soil of New York. In such case, the actual cost of transporting a passenger and a ton between the Hudson and Boston, would not materially exceed a dollar, and all above would be profit.

With such power, and a reasonable discretion in its use, the traffic may be indefinitely increased, for the Reading Railroad Company's last report shows that a single railroad with easy grades may transport one and three-fourth million of tons in one direction, at a cost not exceeding $\frac{55}{100}$ of a cent per ton a mile, with large profits, and without exhausting its capacity.

8th.—The eighth inquiry has been already answered.

Your committee have considered the evidence in the case, and the memorial of the Western Railroad Company, presented to the general court during its present session, and printed, but not yet distributed, and find that company entirely in the vocative. They concede that upon their line and other routes, either like theirs, or used for transporting freight and passengers short distances, in small quantities, and with frequent charges for loading and unloading, a cost is incurred of as much as one and one-half cent per ton and per passenger a mile, or at the rate of three dollars per ton and per passenger between the Hudson and Boston.

They concede also that they cannot compete successfully with the circuitous navigation from Albany via New York and Cape Cod to the sea ports of our bay. These concessions suffice to prove that the Western Railroad is, from its heavy grades, curves, elevation and length, incompetent to control the commerce of the West. While the evidence clearly shows that lines like the Tunnel route of reduced length, grades, and summit, with superior curves, can command the trade. It was expressly in proof that the Rochester and Syracuse Railroad, with grades and curves, not materially different from those of the Tunnel route, transported passengers and freight at rates less than one dollar per ton, and per passenger, between Troy and Boston; and the Reading Railroad transports freight at similar rates. While the Western concedes it cannot compete with the circuitous navigation around the cape, burthened with charges for insurance, interest, wharfage and damage to freight by confinement in the hold of the ship, the Hudson River line, with easy grades, is transporting heavy freight, summer and winter, from Troy to New York in direct competition with the Hudson, and providing a large supply of freight cars.

9th.—Our ninth inquiry follows—Will the construction of the Tunnel line injure the Western Railroad, jeopardize the State loan or seriously impair the income from the stock held in that enterprise.

There can be no question that the Tunnel route will divert the principal part of the through traffic of the Western, but this constitutes little more than one-fifth of the entire business of the company, and is the least profitable part of the whole.

For the past year it was composed of fifty-nine thousand three hundred and seventy-five tons of freight, carried at less than local rates, and at prices little above the alleged rate of cost, and thirty-five thousand four hundred and thirty-seven through passengers of first and second class at the rate of cost set forth in the memorial of the Western Railroad Company, viz.: one and one-half cents per ton and per passenger a mile, or $3 each, between Boston and Albany. It may be inferred from the tariffs, the net income derived from its through traffic must fall below one hundred thousand dollars. Should the cars and engines and stations now used in the business be sold, or used, as they may be, for the local business, they would represent a capital on which the interest would be many thousand dollars. Assuming the Western Railroad to lose its entire through traffic, the loss would probably, on the data it has given, not affect the dividend more than one or two per cent. And should such loss be eventually sustained, the Tunnel route cannot come into competition for five years, from December last. During this time it is fair to presume that the local business, which has been progressive, will increase at least thirty per cent., and more than compensate for the diversion.

The local business of the line would not be seriously impaired, for the northern section of the State now receives its breadstuffs principally from Ogdensburg and the Rutland route, and not from Albany via the Western Railroad.

As respects the loan of the State to the Western Railroad Company, the sinking fund provided for its extinguishment will, before the completion of the tunnel, exceed the sum of eighteen hundred thousand dollars, and the road must be ample security, under any circumstances, for the residue of the loan.

As respects the stock held by the State, it has paid more than the interest on the State bonds, and stands at less than par, and your committee can anticipate no loss of income on this investment which should deter the State from aiding an enterprise important to the great interests of the State, one which will pay the State most liberally for its indorsement.

10th.—Our next inquiry is, whether this route will develop, to any extent, the local resources of Massachusetts? Upon this point your committee are well assured it will wake to new life and action, two of the richest valleys of the State, abounding in people possessing fertile farms, water power, lumber timber, and great mineral resources. The population is keenly alive to the importance of the subject, and await with intense interest the action of the State. Its favorable action will give an impulse, also, to the valley of Miller's River, and add a new value to the capital its people have embarked in the Vermont and Massachusetts Railroad.

That enterprise has received no aid from the State, has languished, and has suffered from unfavorable legislation, while the State credit has sustained and made productive the line across the southern part of the State, and an opportunity now presents itself to the State, of incidentally giving some compensation for its apparent neglect of the northern half of Massachusetts.

12th.—But the question recurs—Is there a necessity for the interposition of the State, and can adequate security be given.

The case is one which demands the action of the State; the obstacle is one serious in its character—one with which the local means of the people on the line are inadequate to cope. It requires a large sum and considerable time for its removal: individuals and private companies have not the ability to penetrate the mountain. It is too of the highest importance that the commerce of the State should be charged with a low rate of interest, and not with seven per cent. bonds issued at a discount. Massachusetts has it in her power to provide the funds, at the lowest rates, to remove a great physical barrier to her trade; and if Mexico, in her infancy could, in one year, make twenty-one thousand six hundred and fifty-three feet of tunnel; if our sister State, New York, with a valuation little above our own, can afford to give three millions to one line of railway, and to expend twelve millions more to enlarge a single canal for the purpose of extinguishing a charge of seventy-five cents on a ton on freight, *a fortiori*, Massachusetts should advance one-sixth of one of these sums, on security, to remove a mountain barrier, and save, thereby, both on passengers and freight, more than twice the charge New York seeks to avoid. And it might well be argued, that those who offer, under such circumstances, to protect the State and to assume the risk, are entitled to her thanks, whatever may be their local interest.

Your committee, however, are satisfied ample security is offered for the loan. It has been proved to their satisfaction, that the local population and business on the route from Greenfield to Adams, per mile of track, greatly exceeds such population and business on the route of the Western Railroad from Worcester to Springfield, when that line was begun, and that route has made large returns from its local business. The Troy and Greenfield Company seek no advance until they have completed ten miles of their railroad and the first section of their tunnel, and have made their enterprise productive; but, like the man who counts the cost of his house before he begins and provides the means, they seek a bill which shall enable them to pay for the tunnel as the work is completed. Your committee, therefore, propose to grant them a loan of two millions of dollars in State bonds on a mortgage of their railroad and tunnel, upon the following conditions, viz.: that when the company has finished ten miles of their railroad and one-eighth of their tunnel, they shall receive two hundred thousand dollars in State scrip, and when they have finished twenty miles of their railroad and one-fourth of their tunnel, two hundred thousand dollars more.

These advances will not exceed twenty thousand dollars per mile on the railroad, irrespective of the tunnel, and the advances will be applied to carry on the enterprise. When the company have finished thirty-two miles of railroad and one-third of their tunnel, your committee propose another advance of four hundred thousand dollars to carry forward the work, and this sum will be but twenty-five thousand dollars per mile of railroad, irrespective of eight thousand lineal feet of tunnelling. When the tunnel is one-half complete, they propose an equal advance; another equal advance when it is three-fourths done, and the balance of four hundred thousand dollars, upon the entire completion of the railroad and through the tunnel, and its equipment for use.

Your committee are of opinion that the early construction of the railroad will facilitate the work at the tunnel, develop the business of the valleys, and pay all, or nearly all, accruing interest, as the work advances.

In accordance with these views, they respectfully submit to you the annexed bill, and recommend its passage, for they believe it essential to the progress and future prosperity of Massachusetts.

For the Committee,

A. A. RICHMOND, *Chairman.*

Commonwealth of Massachusetts.

In the Year One Thousand Eight Hundred and Fifty-Three.

AN ACT

To enable the Troy and Greenfield Railroad Company to Construct a Tunnel through the Hoosac Mountain.

Be it enacted by the Senate and House of Representatives in General Court assembled, and by the authority of the same, as follows :

SECT. 1. The treasurer of the Commonwealth is hereby authorized and directed to issue scrip or certificates of debt in the name and in behalf of the Commonwealth, and under his signature and the seal of the Commonwealth, for the sum of two millions of dollars, which may be expressed in the currency of Great Britain, and may be payable to the bearer thereof in London, and bearing an interest of five per cent. per annum, payable semi-annually in London on the first days of April and October; or the said scrip may be issued in federal currency, payable in Boston, as the directors of the Troy and Greenfield

Railroad Company shall elect when they apply for each and every issue of said scrip, with warrants for the interest, attached thereto, signed by the treasurer, which scrip or certificates in the currency of Great Britain shall be redeemable in London, and those in the federal currency at Boston, at the end of thirty years from the date thereof, and the same shall bear date on the first day of April or October which shall precede the issue of each portion of said scrip, and all such scrip shall be countersigned by the governor of the Commonwealth, and be deemed a pledge of the faith and credit of the Commonwealth for the redemption thereof; and the treasurer of the Commonwealth, under the conditions hereinafter provided, shall deliver the same to the treasurer of the Troy and Greenfield Railroad Company, for the purpose of enabling the said company to construct a tunnel and railroad under and through the Hoosac Mountain, in some place between the "great bend" in Deerfield River, in the town of Florida, at the base of Hoosac Mountain, on the east, and the base of the western side of the mountain, near the east end of the village of North Adams, on the west.

SECT. 2. Whenever it shall be made to appear to the satisfaction of the governor and council, that the Troy and Greenfield Railroad Company shall have obtained subscriptions to their corporate stock, in addition to their present amount of subscribed stock, the sum of five hundred thousand dollars, and twenty per cent. on each and every share of said five hundred thousand dollars shall have been actually paid in, and shall have completed ten miles of their railroad in one or two sections, and three thousand lineal feet of their tunnel under the Hoosac, of size sufficient for two railroad tracks, in one or more sections, a portion of said scrip, to the amount of two hundred thousand dollars, shall be delivered to the treasurer of said company, and when said company shall have completed, in one or two sections, twenty miles of their railroad, and six thousand lineal feet of their said tunnel in one or more sections, an other portion of said scrip, amounting to two hundred thousand dollars, shall be delivered to the treasurer of said company; and when said company shall have completed thirty-two miles of their said railroad, in one or two sections, and one-third part of their said tunnel in lineal feet, in one or more sections, another portion of said scrip, amounting to four hundred thousand dollars, shall be delivered to the treasurer of said company; and when said company shall, in addition to such thirty-two miles of railroad, have completed one-half of their said tunnel, in lineal feet, in one or more sections, another portion of said scrip, amounting to four hundred thousand dollars, shall be delivered to the treasurer of said company; and when said company shall have completed, in addition to said thirty-two miles of railroad, three-fourths of their said tunnel, in lineal feet, in one or more sections, another portion of said scrip, amounting to four hundred thousand dollars, shall be delivered to the treasurer of said company; and when said company shall have completed their said railroad and tunnel through the Hoosac, and opened the same for use, the residue of said scrip, amounting to four hundred thousand dollars, shall be delivered to the treasurer of said company.

SECT. 3. Whenever the treasurer of said company shall receive any of said scrip, he shall, within three months from the receipt of the same, pay to the commissioners of the sinking fund by this act hereafter established, ten per cent. on the amount of the scrip so taken, as a sinking fund; and after the whole of said road is opened for use, twenty-five thousand dollars annually shall be set apart from the income of said road, and paid to said commissioners, and the whole thereof shall be added to said sinking fund, and be managed, invested, and appropriated, as is or shall be provided by law in relation thereto.

SECT. 4. The treasurer of the Commonwealth, the auditor of accounts of the Commonwealth, and the treasurer of the Troy and Greenfield Railroad Company for the time being, shall be the commissioners of the sinking fund of the Troy and Greenfield Railroad Company. The said commissioners shall have the care and management of all the moneys, funds, and securities at any time belonging to said sinking fund, and shall invest the same, but the moneys uninvested and all the securities of said fund, shall be in the custody of the treasurer of said Commonwealth.

SECT. 5. This act shall not take effect until said company, at an annual meeting, or at a special meeting, duly notified for that purpose, shall have assented to the provisions thereof, and shall have executed to the Commonwealth a bond, in such form as the attorney-general prescribed on the issuing of scrip to the Western Railroad Corporation, conditioned, that the Troy and Greenfield Railroad Company shall comply with the provisions of this act, and shall faithfully expend the proceeds of said scrip as herein provided, and shall indemnify and save harmless the Commonwealth from all loss or inconvenience on account of said scrip, and that said company shall well and truly pay the principal sum of said scrip, punctually, when the same shall become due and payable, or such part thereof as the sinking fund aforesaid shall be insufficient to pay, and the interest thereon semi-annually, as the same shall fall due, and shall also assign to the Commonwealth, by suitable instrument or instruments, of the same form with that or those prepared by the attorney-general on the issuing of scrip to the Western Railroad Corporation, their entire road, with its income, and all the franchise and property to them belonging, the whole thereof to be held by the Commonwealth as a pledge, or mortgage, to secure the performance of all the conditions of said bond: *provided*, that the Commonwealth shall not take possession of the said pledged or mortgaged property, or any part thereof, under or by virtue of said mortgage, unless for some substantial breach of some condition of said bond.

SECT. 6. In addition to the security provided in the preceding section, the said company shall assign all the interest they now have, or may hereafter obtain, in the Southern Vermont Railroad Company.

SECT. 7. The Troy and Greenfield Railroad Company are authorized, at any time within one year from the passage of this act to alter the present location of their road: *provided*, that the tunnel shall be located and constructed within the limits prescribed by the first section of this act.

SECT. 8. The time for completing the Troy and Greenfield Railroad is hereby extended for the additional term of five years.

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